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Remarks

Claim 13, 14, 19, and 23 has been canceled. Claims 29 and 30 have been added. Claims 1, 16, 18, 21, 24, and 28 have been amended. Accordingly, claims 1-12, 15-18, 20-22 and 24-30 are pending in the present application.

*Claim Rejections under 35 U.S.C § 112*

The applicant respectfully requests the examiner remove the indefiniteness rejection of claims 7, 8, and 16-18. Courts have held that the word 'about' in a claim is appropriate where the claim range lacks strict boundaries. *Conopco, Inc. v. May Department Stores Co.*, 784 F. Supp. 648, 670, 24 USPQ2d at 1735-36 (E.D. Mo. 1992). Furthermore, "about" is not an arbitrary term which renders a claim as indefinite under 112 second paragraph when explaining a claimed range. *Syntex (U.S.A.) Inc. v. Paragon Optical Inc.*, 7 USPQ2d 1001, 1038 (D. Ariz. 1987). It is a flexible term with a meaning similar to 'approximately.' ". *Id.* Claims 7, 8, 16-18 recite feed composition ranges of vaporized water, anode stoichiometries of the fuel cell stack, and feed ratios of steam to carbon and oxygen to carbon. These parameters do not always yield exact figures, thus the claims utilize the word "about" to explain that the claimed ranges are approximations. Accordingly, "about" does not render the claimed ranges indefinite, and one of ordinary skill in the art would understand the scope of the claims.

Claims 16 and 18 have been amended to set forth the metes and bounds of the patent protection desired. The preferable ranges have been deleted from these claims, and have been incorporated into new claims 29 and 30.

*Claim Rejections under 35 U.S.C. 102(b) based on Grasso and Eggert*

The Eggert and Grasso references both do not anticipate the claimed invention. As the Examiner is well aware, a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."

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*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The term "water" used in the Grasso (6,274,259), and Eggert should not be interpreted to encompass water vapor, or steam. Applicant's invention utilizes an HT-PEMFC stack, which operates at temperatures between 100 to 150°C. Because the HT-PEMFC operates at temperatures above the boiling point of water, the stack generates steam by vaporizing the cooling water which is fed to the stack. In contrast, the fuel stacks disclosed in Grasso and Eggert operate below the boiling point of water producing liquid water which is then converted into steam through external steam generators or evaporators respectively. Accordingly, the Grasso and Eggert references utilize the term "water" to describe liquid water, not water vapor or steam; therefore, the term should not be so broadly interpreted.

Moreover, as the examiner states on page 6 of the Office Action, the Grasso reference does not anticipate the claimed invention, because the "reference fails to teach generation of steam by the fuel cell stack for use in the primary reactor". Applicants affirm this position that the present invention is not anticipated by the Grasso reference. Accordingly, this rejection should be withdrawn.

Similarly, the Eggert reference does not anticipate the claimed invention as recited in amended claim 21, because the reference does not teach all of the recited elements. Amended claim 21 recites the combining of a superheated reactant stream with a stream of compressed air before entering the primary reactor. As the examiner states on page 15 of the Office Action, "the [Eggert]

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reference fails to disclose the addition of compressed air to the superheated stream". Thus, the claimed invention is not anticipated by the Eggert reference.

Furthermore, the claimed invention recites a HT-PEMFC, which is a different apparatus than the fuel cell stack in the Grasso and Eggert references. The HT-PEMFC operates at different temperatures and pressures than other PEM fuel cells, and produces different results. Thus, the Eggert and Grasso references do not anticipate the claimed invention, because these references do not teach an invention identical to the recited invention of claims 1, 2, 6, 9, 21, 22, and 28.

***Claim Rejection under 35 U.S.C. 103 based on combination of Grasso and Bloomfield***

Amended claim 1 is nonobvious in view of the Grasso and Bloomfield (3,982,962) references. Grasso does not teach a fuel processing system containing compressors, anode, cathode, and stack excess steam condensers. Bloomfield is cited for teaching these process components and for teaching using water to cool the fuel cell stack, wherein the water is partially vaporized in the fuel stack; however, the combination of Grasso and Bloomfield does not teach or suggest every element of the claimed invention. The combination of references does not teach or suggest *inter alia* that the air used for condensing a portion of the steam in the excess steam condenser can then be fed to the inlet of the compressor. The examiner states that this step would be obvious to one of ordinary skill in the art of plant design and optimization; however, there is no evidence, outside of applicant's specification, that this would be an effective means of providing increased efficiency in a fuel cell plant. The remaining rejections to the claims depend from claim 1 are noted by the applicant but are now believed moot, as none of the remaining cited references cure the above cited deficiencies in the combination of Bloomfield and Grasso. As a result, amended claim 1, and dependent claims 2-12, 15-18, 20, 29, and 30 should now be in condition for allowance.

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***Claim Rejection under 35 U.S.C. 103 based on combination of Eggert and other references***

The remaining rejections are moot as claims 22 and 24-27 depend from amended claim 21, which is nonobvious over the Eggert reference in view of Okamoto (U.S. 2002/0177016), Towler (6,375,924), Grasso, Baukal Jr. (Heat Transfer in Industrial Combustion), Van Dine (U.S. 2003/0027025). As stated above, Eggert does not teach the mixing of the superheated reactant stream with compressed air as recited by amended claim 21. Eggert combined with Okamoto fails to teach this element of claim 21. Okamoto is cited for teaching that a stream of compressed air can be fed to a reformer, but it does not teach or suggest that the superheated reactant stream can be mixed with compressed air prior to feeding the reformer. Moreover, Okamoto does not contain a superheat exchanger in its system, which demonstrates that the Okamoto reference does not teach that a superheated reactant stream can be mixed with a compressed air stream prior to feeding the reformer. As a result, applicants assert that one of ordinary skill in the art would not combine the Eggert and Okamoto references, because the components used in the respective systems are incompatible.

Similarly, the combination of Eggert and the other cited references does not teach or suggest *inter alia* that a superheated reactant stream can be mixed with a compressed air stream prior to feeding the reformer. In addition, these other references contain systems which are incompatible with Eggert. Towler is cited for teaching WGS heat exchanger in fluid contact with the HT-PEMFC stack, but the Towler reference does not teach the heating of the cooling water used in the HT-PEMFC stack. Eggert should not be combined with Grasso and Baukal, because Grasso, as stated above, does not contain a fuel cell stack adapted to generate steam, and Baukal is cited for teaching preheating fuel to a combustor, but not in conjunction with a fuel cell stack. Eggert and Van Dine should not be combined because Van Dine's fuel processing system

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does not contain a catalytic combustor as recited in claim 21. Accordingly, the claimed invention is nonobvious, because there is no suggestion to combine these references, and the combination does not teach all of the recited elements of amended claim 21. Amended independent claim 21, and claims 22 and 24-27 that depend from claim 21 are now in condition for allowance.

The Applicants respectfully submit that, in view of the above amendments and remarks, the application is now in condition for allowance. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully requested.

Respectfully submitted,

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